

Li 113381con

IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE

**Patent Application**

Inventor(s)	Ye Li	Case Name	Li 113381con
Filing Date		Serial No.	
Examiner		Group Art Unit	
Title	Pilot-Aided Channel Estimation for OFDM in Wireless Systems		

COMMISSIONER FOR PATENTS  
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SIR:

PRELIMINARY AMENDMENT

Please amend the above-identified application as follows:

IN THE CLAIMS:

1. (delete).
2. (delete).
3. (delete).
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19. (delete).
20. (delete).
21. (New) A method for processing an OFDM signal received over a wireless communication channel, said OFDM signal comprising a packet of a number N of OFDM blocks, each OFDM block comprising a number K of signal tones, the method comprising the steps of
  - sequentially receiving N channel-impaired OFDM blocks;
  - computing noisy channel estimates, based on said channel-impaired blocks;
  - arranging the noisy channel estimates into a first array having a first axis representative of a frequency index of the noisy channel estimates and a second axis representative of a time index of the noisy channel estimates;
  - performing a two-dimensional inverse Fourier transform on said first array;

multiplying the inverse Fourier transformed first array with a second array representing a two-dimensional filter to thereby form a third array; and performing a two-dimensional Fourier transform on said third array to thereby form a fourth array comprising elements representative of an estimate of channel parameters for said wireless communication channel.

**22. (New)** The method of claim 1, wherein the two-dimensional filter is a diamond shaped filter.

**23. (New)** The method of claim 1, wherein said step of computing the noisy channel estimates is performed by multiplying the elements of each channel-impaired OFDM block with corresponding reference pilot symbol values known to have been inserted into that block upon transmission.

**24. (New)** The method of claim 1, wherein said step of computing the noisy channel estimates is performed by multiplying the elements of each channel-impaired OFDM block with corresponding estimates of a demodulated signal.

**25. (New)** The method of claim 1, wherein said step of computing the noisy channel estimates is performed by multiplying the elements of each channel-impaired OFDM block with corresponding estimates of a decoded signal.

**26. (New)** The method of claim 1, wherein said step of sequentially receiving the N blocks is performed at the receiver by a plurality of antennas, each of said antennas sensing N channel-impaired blocks.

**27. (New)** A method of estimating channel parameters for a wireless communication channel by transmitting a signal from a transmitter to a receiver, the method comprising the steps of:

inserting pilot symbols at predetermined positions in a plurality of blocks, each block comprising a plurality of data symbols representative of a signal being transmitted;

sequentially transmitting each of said plurality of blocks over a finite number of tones, said finite number of tones being broadcast substantially simultaneously for each block;

sequentially receiving a corresponding plurality of channel-impaired blocks at the receiver;

computing a corresponding plurality of noisy channel estimates from said plurality of channel-impaired blocks;

arranging the plurality of noisy channel estimates into a first array having a first axis representative of a frequency index of the noisy channel estimates and a second axis representative of a time index of the noisy channel estimates;

performing a two-dimensional inverse Fourier transform on said first array;

multiplying the inverse Fourier transformed first array with a second array representing a two-dimensional filter to thereby form a third array; and

performing a two-dimensional Fourier transform on said third array to thereby form a fourth array comprising elements representative of the channel parameters.

**28. (New)** The method of claim 7, wherein said pilot symbols are inserted with a non-rectangular pattern in a 2-dimensional array that comprises tone bins along one dimension and time along the other dimension.